

REMARKS

By the above amendment, dependent claims 8 and 10 have been amended to clarify features of the present invention and a new claim 11, dependent upon claim 7 has been added, reciting features corresponding to that set forth in claim 10.

The rejection of claim 7 under 35 U.S.C. §102(b) as being anticipated by Ishii (US 5,851,298) and the rejection of claims 8-10 under 35 U.S.C. §103(a) as being unpatentable over Ishii in view of Hatano et al (US 5,709,757), such rejections are traversed insofar as they are applicable to the present claims, and reconsideration and withdrawal of the rejections are respectfully requested.

As to the requirements to support a rejection under 35 U.S.C. 102, reference is made to the decision of In re Robertson, 49 USPQ 2d 1949 (Fed. Cir. 1999), wherein the court pointed out that anticipation under 35 U.S.C. §102 requires that each and every element as set forth in the claim is found, either expressly or inherently described in a single prior art reference. As noted by the court, if the prior art reference does not expressly set forth a particular element of the claim, that reference still may anticipate if the element is "inherent" in its disclosure. To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill." Moreover, the court pointed out that inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.

With regard to the requirements to support a rejection under 35 U.S.C. 103, reference is made to the decision of In re Fine, 5 USPQ 2d 1596 (Fed. Cir. 1988), wherein the court pointed out that the PTO has the burden under §103 to establish a prima facie case of obviousness and can satisfy this burden only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art would lead that individual to combine the relevant teachings of

the references. As noted by the court, whether a particular combination might be "obvious to try" is not a legitimate test of patentability and obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination. As further noted by the court, one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention.

Furthermore, such requirements have been clarified in the recent decision of In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002) wherein the court in reversing an obviousness rejection indicated that deficiencies of the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge".

The court pointed out:

The Examiner's conclusory statements that "the demonstration mode is just a programmable feature which can be used in many different device[s] for providing automatic introduction by adding the proper programming software" and that "another motivation would be that the automatic demonstration mode is user friendly and it functions as a tutorial" do not adequately address the issue of motivation to combine. This factual question of motivation is immaterial to patentability, and could not be resolved on subjected belief and unknown authority. It is improper, in determining whether a person of ordinary skill would have been led to this combination of references, simply to "[use] that which the inventor taught against its teacher."... Thus, the Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion. (emphasis added)

Turning to claim 7 and the rejection thereof under 35 U.S.C. §102(b) as being anticipated by Ishii, the Examiner recognizes structural differences between Ishii and the claimed invention of claim 7 and states:

Although Ishii doesn't explicitly disclose a vacuum condition in the gap between the upper and cooling member, it is inherent that the valve would be used to create a vacuum pressure to enhance the cooling effect

of the cooling member (column 5, lines 33-41). (emphasis added)

In accordance with the present invention, as illustrated in Fig. 2 of the drawings of this application, for example, and as described in the paragraph bridging pages 11 and 12 of the specification, it is necessary both to heat up the ceramics plate 15 forming an upper member of the stage by the heater in the absence of any appreciable heat input from the plasma and to remove the incident heat energy to the wafer when the processing gets started and there is certain heat input from the plasma. Thus, as illustrated in Fig. 2 and as described, a gap 18 of 0.5 mm is provided between the ceramics plate 15 and the water-cooling jacket 14 with a helium gas with the pressure of 1 kPa or below being introduced into this gap. Numeral 23 indicates a helium gas introduction or inlet port, whereas numeral 24 indicates a helium exhaust or outlet port. When it is required to maintain the wafer at high temperatures in the absence of any heat input from the plasma, as described at page 11, lines 21-26, a valve 25 which is utilized for introducing helium gas to the gap is closed and a valve 26 for the outlet port 24 is opened so as to let a pressure within the gap be the same as that of the processing chamber (customarily set at about several Pa or less) thus establishing vacuum thermal insulation. As recited in claim 7, the present invention includes "a valve for adjusting a pressure of a space within the gap to be at a vacuum condition while the wafer is placed on the upper member of the stage", and as such, improved temperature control management is effected. As further pointed out in the specification at page 11, line 26 to page 12, line 2, when a need arises to cool down the ceramics plate due to heat input from the plasma, the valve 25 is opened and the valve 26 is simultaneously closed for introduction of the helium gas into the gap to thereby provide a heat transfer from the ceramics plate toward the water cooling jacket, thus performing cooling.

Irrespective of the position set forth by the Examiner, applicants submit that while the Examiner refers to Ishii disclosing a sealed gap between the upper member and the cooling member and "a valve (Figure 1 between #48 and helium tank #50)",

it is apparent that the helium gas from the helium tank 50, as described in col. 5, lines 33-41 of Ishii, is supplied to the space 46 through the valve and gas introduction pipe 48 so as to insure thermal conductivity between the susceptor body 6 and the cooling section 10 in which the space 46 is filled with heat conductive gas (helium gas). Thus, the valve arranged between the helium gas source 50 and the gas introduction pipe 48 is utilized for supplying helium gas to the space 46.

Applicants submit that such valve of Ishii corresponds to the valve 25 of the present invention, as illustrated in Fig. 2 connected to the inlet port 23 for supplying the space or gap with helium gas which, as indicated by the Examiner, enhances the cooling effect of the cooling member. On the other hand, it is readily apparent that Ishii does not disclose in the sense of 35 U.S.C. §102 or teach in the sense of 35 U.S.C. §103 another valve as represented by the valve 26 in Fig. 2 of the drawings of this application, which is coupled to an outlet or exhaust port 24 of the present invention so as to establish a vacuum condition in a pressure of a space within the gap while the wafer is placed on the upper member as disclosed and claimed in this application. As to the requirements for establishing inherency, reference is made to the decision of In re Robertson, supra which sets forth that inherency may not be established by probabilities or possibilities, and applicants submit that contrary to the position set forth by the Examiner, Ishii fails to disclose or teach the claimed subject matter which is not inherent or rendered obvious thereby. As such, applicants submit that claim 7 patentably distinguishes over Ishii in the sense of 35 U.S.C. §102 and should be considered allowable thereover.

As to the rejection of claims 8-10 under 35 U.S.C. §103 over the combination of Ishii and Hatano et al, applicants note that these claims recite further features of the present invention not disclosed or taught in this cited art. More particularly, with respect to the features of "a valve for adjusting a pressure of a space within a gap to be at a vacuum condition while the wafer is placed on the upper member of the stage" as recited in claim 7 and therewith the dependent claims, such feature is not

disclosed by Hatano et al. Applicants note that dependent claims 8 and 11 incorporate the features of parent claim 7 therein, and applicants submit that with respect to the provision of a gap and a valve operating in the manner defined, which is not disclosed or taught by Ishii, as pointed out above, Hatano et al fails to overcome the aforementioned deficiencies of Ishii. More particularly, applicants submit that there is no disclosure in Hatano et al that surfaces of the cooling jacket and the upper member which delimit a gap therebetween which is sealed, nor that a valve for adjusting a pressure of a space within the gap to be at a vacuum condition while the wafer is placed on the upper member of the stage. Thus, the proposed combination fails to provide the claimed features of claim 7 and therewith the dependent claims in the sense of 35 U.S.C. §103, and claim 7 and dependent claims 8 and 11 should be considered allowable thereover.

With respect to dependent claims 8 and 11, applicants note that claim 8 has been amended to recite the feature of at least a portion of the cooling jacket disposed so as to oppose a portion of the upper member through the gap is subjected to one of mirror surface machining and plating treatment, while new dependent claim 11 further recites the feature of a member which is disposed at an outer periphery of the upper member so as to oppose the upper member, and at least a portion of the surface of the member which opposes the upper member is subjected to one of mirror surface machining and plating treatment.

In accordance with the present invention, as described in the paragraph bridging pages 15 and 16 of the specification of this application, for the purpose of preventing outward heat release via radiation from the ceramics plate, the water cooling jacket has its surface 37 with mirror polishing or grinding treatment applied thereto. That is, at least in the area of the gap, the surface 37 of the water cooling jacket 14 is provided with a mirror polishing or grinding treatment. As described at page 16, thermal emissivity on the surface of the ceramic plate of 240 mm in diameter measures 0.8, whereas thermal emissivity on a surface of the water cooling

jacket is 0.3 in a state that it was not subjected to any mirror polishing and 0.1 in the state that it experienced mirror polishing. As further indicated, the water cooling jacket is cooled down and is kept at 30°C, wherein in case the ceramic plate's temperature is held at 500°C, an increased amount of heat as large as about 250 W will be expelled in the case of no polishing, whereas in the case that mirror polishing is done, it is lowered to an extent equal to about 90 W, which is roughly one-third of the former. Thus, improved operation is obtained with the mirror polishing as described, which is now recited in dependent claim 8, it being noted that a similar feature is recited in independent claim 9. Furthermore, new dependent claim 11 recites the feature of a member which is disposed at an outer periphery of the upper member so as to oppose the upper member, and at least a portion of a surface of the member which opposes the upper member being subjected to one of mirror surface machining and plating treatment. As described in the paragraph bridging pages 16 and 17 of the specification, in order to lower heat release from the outer periphery of the ceramics plate 15, a radiant heat insulating material 38 having chromium plating applied to its surface which surrounds the ceramic plate 15, i.e., the surface which is opposed to the outer periphery of the ceramics plate is chromium plated. As described, in the absence of any radiant heated insulation material, a relatively large amount of radiant heat of approximately 80 W is expelled toward the inner wall of the vacuum chamber with its temperature kept at about a room temperature, whereas with use of the radiant heat insulation material having the surface opposed to the outer periphery of the ceramic plate being chromium plated, the amount of radiant heat expelled toward the inner wall is introduced to about 30 W. As recognized by the Examiner, Ishii does not disclose in the sense of 35 U.S.C. §102 or teach in the sense of 35 U.S.C. §103 the recited features. However, the Examiner contends that "Hatano et al discloses a mirror surface (column 6, lines 60-62). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the mirror finish of Hatano et al

in the apparatus of Ishii because a mirror finish allows radiation heat to be reflected.”

Irrespective of the Examiner's contentions concerning Hatano et al, applicants note that this patent discloses a heat insulating wall 27 which surrounds the peripheral portions of the heater 26c and table 25, as described in col. 6, lines 60-62 of Hatano et al, “The surface of the heat insulating wall 27 is mirror-finish so as to reflect radiation heat from the ambient.” (emphasis added) That is, the outer surface of the heat insulating wall 27 which opposes the walls of the vacuum chamber is mirror finished so as to radiate heat outwardly. In contrast, in accordance with the present invention, the surface of the member which opposes the outer peripheral wall of the upper member in the form of the ceramics plate 15 is chromium plated, and applicants submit that Hatano et al does not disclose or teach in the sense of 35 U.S.C. §103 the recited feature of dependent claim 11, which also corresponds to that of dependent claim 10. Furthermore, it is readily apparent that Hatano et al provides no disclosure or teaching of mirror polishing a surface of the cooling jacket which is opposed to the upper member or ceramic plate 15 through the gap as recited in dependent claim 8 as well as independent claim 9. Thus, applicants submit that the Examiner's suggestion to including a mirror finish at various portions of Ishii based upon the disclosure of Hatano et al represents a hindsight reconstruction attempt utilizing the principle of “obvious to try” which is not the standard of 35 U.S.C. §103. See In re Fine, supra. Accordingly, applicants submit that dependent claims 8 and 11 patentably distinguish over the proposed combination of references in the sense of 35 U.S.C. §103 and should be considered allowable thereover.

With respect to independent claim 9, as pointed out above, such claim in addition to reciting the features of surfaces of the cooling jacket and the upper member delimiting a gap therebetween which is sealed, recite the feature of “a portion disposed on a surface of the cooling jacket so as to oppose the upper member through the gap being subjected to one of mirror surface machining and

plating treatment", in a manner now set forth in dependent claim 8. As discussed, this structural arrangement which is recited in dependent claim 8 and independent claim 9 provides for improved operation and is not disclosed or taught by Ishii nor Hatano et al taken alone or in any combination thereof. Furthermore, dependent claim 10 has been amended to recite features similar to that recited in new dependent claim 11, and as pointed out above, neither Ishii nor Hatano et al taken alone or in any combination thereof provide a disclosure of such claimed features, such that independent claim 9 and dependent claim 10 patentably distinguishes over the cited art in the sense of 35 U.S.C. §103 and should also be considered allowable thereover.

In view of the above amendments and remarks, applicants submit that claims 7-11, as presented in this application, patentably distinguish over the cited art and should now be in condition for allowance. Accordingly, issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicant's petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (500.41374CX1) and please credit any excess fees to such deposit account.

Respectfully submitted,



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